

WHAT IS CLAIMED IS:

- 1               1.     A system for managing clock adjustment in a storage system,  
2 comprising:
  - 3               a clock configured to provide a current time, wherein the current time is used  
4 to enforce a content retention period;
  - 5               control logic configured to receive a proposed new time for the clock;
  - 6               control logic configured to determine whether the proposed new time is  
7 reasonable; and
  - 8               control logic configured to adjust the current time of the clock to the proposed  
9 new time if it is determined that the proposed new time is reasonable.
- 1               2.     The system of claim 1 further comprising:  
2               control logic configured to prevent adjustment of the clock to the proposed  
3 new time if it is determined that the proposed new time is unreasonable.
- 1               3.     The system of claim 1 wherein the control logic configured to  
2 determine whether the proposed new time is reasonable further comprises:  
3               control logic configured to determine whether the proposed new time falls  
4 within a specific range;  
5               wherein if the proposed new time falls within the specific range, the proposed  
6 new time is determined to be reasonable.
- 1               4.     The system of claim 3 wherein the specific range is stored in a  
2 memory.
- 1               5.     The system of claim 3 further comprising:  
2               control logic configured to calculate the specific range.
- 1               6.     The system of claim 5 wherein the specific range is calculated using a  
2 statistical method.
- 1               7.     The system of claim 3 wherein the control logic configured to  
2 determine whether the proposed new time falls within the specific range further comprises:  
3               control logic configured to calculate a first difference between the proposed  
4 new time and the current time provided by the clock;

5                   control logic configured to calculate a second difference between the current  
6 time provided by the clock and a last adjustment time, the last adjustment time representing  
7 the time which the clock was last adjusted;

8                   control logic configured to select the specific range based on the second  
9 difference; and

10                  control logic configured to compare the first difference and the specific range;  
11                  wherein if the first difference is less than or equal to the specific range, the  
12 proposed new time is determined to be reasonable.

1                 8.       A storage system comprising:

2                   a clock configured to provide a current time, wherein the current time is used  
3 to enforce a content retention period;

4                   a memory configured to store clock management information; and

5                   a storage access program configured to:

6                   receive a proposed new time for the clock;

7                   determine whether the proposed new time is reasonable using the clock  
8 management information; and

9                   adjust the current time of the clock to the proposed new time if it is  
10 determined that the proposed new time is reasonable.

1                 9.       The storage system of claim 8 wherein the storage access program is  
2 further configured to prevent adjustment of the clock to the proposed new time if it is  
3 determined that the proposed new time is unreasonable.

1                 10.      The storage system of claim 8 wherein the storage access program is  
2 further configured to determine whether the proposed new time falls within a specific range;  
3 and

4                   wherein if the proposed new time falls within the specific range, the proposed  
5 new time is determined to be reasonable.

1                 11.      The storage system of claim 10 wherein the clock management  
2 information includes a table having a plurality of maximum adjustable time ranges; and  
3                  wherein the specific range is selected from the plurality of maximum  
4 adjustable time ranges.

1                   12. The storage system of claim 11 wherein the plurality of maximum  
2 adjustable time ranges are calculated using a statistical method.

1                   13. The storage system of claim 11 wherein the clock management  
2 information further includes a last adjustment time, the last adjustment time representing the  
3 time that the clock was last adjusted; and

4                   wherein the storage access program is further configured to determine whether  
5 the proposed new time is reasonable using the last adjustment time, the current time and the  
6 specific range.

1                   14. The storage system of claim 13 wherein the storage access program is  
2 further configured to:

3                   calculate a first difference between the proposed new time and the current  
4 time;

5                   calculate a second difference between the current time and the last adjustment  
6 time; and

7                   select the specific range from the plurality of maximum adjustable time ranges  
8 based on the second difference; and

9                   compare the first difference and the specific range to determine whether the  
10 proposed new time is reasonable;

11                  wherein if the first difference is less than or equal to the specific range, the  
12 proposed new time is determined to be reasonable.

1                   15. The storage system of claim 10 wherein the storage access program is  
2 further configured to calculate the specific range.

1                   16. A storage system comprising:

2                   a clock configured to provide a current time, wherein the current time is used  
3 to enforce a content retention period;

4                   a memory configured to store clock management information, wherein the  
5 clock management information includes a last adjustment time and a plurality of maximum  
6 adjustable time ranges, wherein the last adjustment time represents the time which the clock  
7 was last adjusted; and

8                   a storage access program configured to:

9                   receive a proposed new time for the clock;

10                   determine whether the proposed new time is reasonable using the  
11 current time, the last adjustment time and a specific range selected from the plurality of  
12 maximum adjustable time ranges; and

13                   adjust the current time of the clock to the proposed new time if it is  
14 determined that the proposed new time is reasonable.

1                   17.     The storage system of claim 16 wherein the storage access program is  
2 further configured to prevent adjustment of the clock to the proposed new time if it is  
3 determined that the proposed new time is unreasonable.

1                   18.     The storage system of claim 16 wherein the storage access program is  
2 further configured to:

3                   calculate a first difference between the proposed new time and the  
4 current time;

5                   calculate a second difference between the current time and the last  
6 adjustment time; and

7                   select the specific range from the plurality of maximum adjustable time  
8 ranges based on the second difference;

9                   wherein if the first difference is less than or equal to the specific range, the  
10 proposed new time is determined to be reasonable.

1                   19.     The storage system of claim 16 wherein the plurality of maximum  
2 adjustable time ranges are calculated using a statistical method.

1                   20.     A method for managing clock adjustment in a storage system, the  
2 storage system having a clock providing a current time for enforcing a content retention  
3 period, comprising:

4                   receiving a proposed new time for the clock;

5                   determining whether the proposed new time is reasonable; and

6                   adjusting the current time of the clock to the proposed new time if it is  
7 determined that the proposed new time is reasonable.

1                   21.     The method of claim 20 further comprising:

2                   preventing adjustment of the clock to the proposed new time if it is determined  
3 that the proposed new time is unreasonable.

1           22. The method of claim 20 wherein determining whether the proposed  
2 new time is reasonable further comprises:  
3           determining whether the proposed new time falls within a specific range;  
4           wherein if the proposed new time falls within the specific range, the proposed  
5 new time is determined to be reasonable.

1           23. The method of claim 22 further comprising:  
2           calculating the specific range.

1           24. The method of claim 23 wherein the specific range is calculated using  
2 a statistical method.

1           25. The method of claim 22 wherein determining whether the proposed  
2 new time falls within the specific range further comprises:  
3           calculating a first difference between the proposed new time and the current  
4 time provided by the clock;  
5           calculating a second difference between the current time provided by the clock  
6 and a last adjustment time, the last adjustment time representing the time which the clock was  
7 last adjusted;  
8           selecting the specific range based on the second difference; and  
9           comparing the first difference and the specific range;  
10          wherein if the first difference is less than or equal to the specific range, the  
11 proposed new time is determined to be reasonable.

1           26. A method for managing clock adjustment in a storage system, the  
2 storage system having a clock configured to provide a current time, wherein the current time  
3 is used to enforce a content retention period, and a memory configured to store clock  
4 management information, the method comprising:  
5           receiving a proposed new time for the clock;  
6           determining whether the proposed new time is reasonable using the clock  
7 management information; and  
8           adjusting the current time of the clock to the proposed new time if it is  
9 determined that the proposed new time is reasonable.

1           27. The method of claim 26 further comprising:

2                    preventing adjustment of the clock to the proposed new time if it is determined  
3    that the proposed new time is unreasonable.

1                    28.        The method of claim 26 wherein determining whether the proposed  
2    new time is reasonable includes:

3                    determining whether the proposed new time falls within a specific range; and  
4                    wherein if the proposed new time falls within the specific range, the proposed  
5    new time is determined to be reasonable.

1                    29.        The method of claim 28 wherein the clock management information  
2    includes a table having a plurality of maximum adjustable time ranges; and  
3                    wherein the specific range is selected from the plurality of maximum  
4    adjustable time ranges.

1                    30.        The method of claim 29 wherein the plurality of maximum adjustable  
2    time ranges are calculated using a statistical method.

1                    31.        The method of claim 29 wherein the clock management information  
2    further includes a last adjustment time, the last adjustment time representing the time that the  
3    clock was last adjusted; the method further comprising:

4                    using the last adjustment time, the current time and the specific range to  
5    determine whether the proposed new time is reasonable.

1                    32.        The method of claim 31 further comprising:

2                    calculating a first difference between the proposed new time and the current  
3    time;

4                    calculating a second difference between the current time and the last  
5    adjustment time; and

6                    selecting the specific range from the plurality of maximum adjustable time  
7    ranges based on the second difference; and

8                    comparing the first difference and the specific range to determine whether the  
9    proposed new time is reasonable;

10                  wherein if the first difference is less than or equal to the specific range, the  
11   proposed new time is determined to be reasonable.

1               33. A method for managing clock adjustment in a storage system, the  
2 storage system having a clock providing a current time for enforcing a content retention  
3 period, comprising:

4               receiving a proposed new time for the clock; and  
5               adjusting the current time of the clock to the proposed new time if the  
6 proposed new time falls within a specific range.

1               34. The method of claim 33 further comprising:  
2               preventing adjustment of the clock to the proposed new time if the proposed  
3 new time does not fall within the specific range.